

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended): A receiver comprising:  
a plurality of antenna elements for receiving a data signal;  
for each antenna element, a plurality of Rake fingers coupled to the antenna element, each finger having a delay, a despreader and a complex weight gain weighing device;  
a complex weight gain generation device coupled to an output of each despreader and an input of each complex weight gain device, wherein the complex weight gain generation device performs a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix being derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger, producing a first matrix, and averaging a multiplication of the output of each despreader with its complex conjugate transpose over each Rake finger, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and  
a summer coupled to an output of each complex weight gain device, producing an estimate of the data signal.

2. (currently amended): The receiver of claim 1 wherein for each Rake finger, the delay is coupled to its antenna element, the despreader is coupled to an output of the delay and the complex weight gain device is coupled to an output of the despreader.

3. (currently amended): A receiver comprising:

a plurality of antenna elements for receiving a data signal;

for each antenna element, a plurality of Rake fingers, each Rake finger for processing a received multipath component of the received data signal of its antenna element by applying a complex weight gain to that received multipath component;

a complex weight gain generator for determining the complex weight gain for each Rake finger ~~for~~ of each antenna element using an input from all of the Rake fingers, wherein the complex weight gain generator performs a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix being derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger, producing a first matrix, and averaging a multiplication of the output of each despreader with its complex conjugate transpose over each Rake finger, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

a summer for combining an output of each Rake finger to produce an estimate of the data signal.

4. (currently amended): The receiver of claim 3 wherein each Rake finger includes a despreader ~~and the input from all of the Rake fingers is an output from the despreader of all the Rake fingers.~~

Claims 5 and 6 (canceled)

7. (currently amended): The receiver of ~~claim 5~~ claim 3 wherein the

complex weight gain applied at each finger is an element of a resulting vector of the ~~produced~~ determined complex weight gains.

8. (currently amended): A receiver comprising:

a plurality of antenna element means for receiving a data signal;

for each antenna element means, a plurality of Rake finger ~~means~~; means, each Rake finger means for processing a received multipath component of the received data signal of its antenna element means by applying a complex weight gain to that received multipath component;

a complex weight gain generating means for determining the complex weight gain for each Rake finger means ~~for~~ of each antenna element means using an input from all of the Rake finger means, wherein the complex weight gain generating means determines the complex weight gains by performing a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix is derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger means, producing a first matrix, and averaging a multiplication of the output of each despreading means with its complex conjugate transpose over each Rake finger means, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

means for combining an output of each Rake finger means to produce an estimate of the data signal.

9. (currently amended): The receiver of claim 8 wherein each Rake finger means ~~having~~ includes a means for despreading ~~and the input from all of the Rake finger means is an output from the despreading means of all the Rake finger~~

means.

Claims 10 and 11 (canceled)

12. (currently amended): The receiver of ~~claim 10~~ claim 8 wherein the complex weight gain applied at each Rake finger means is an element of a resulting vector of the ~~produced~~ determined complex weight gains.

13. (currently amended): A wireless transmit/receive unit (WTRU) comprising:

a plurality of antenna elements for receiving a data signal;

for each antenna element, a plurality of ~~rake~~ Rake fingers coupled to the antenna element, each finger having a delay, a despreader and a complex weight gain weighing device;

a complex weight gain generation device coupled to an output of each despreader and an input of each complex weight gain device, wherein the complex weight gain generation device performs a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix being derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger, producing a first matrix, and averaging a multiplication of the output of each despreader with its complex conjugate transpose over each Rake finger, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

a summer coupled to an output of each complex weight gain device, producing an estimate of the data signal.

14. (currently amended): The WTRU of claim 13 wherein for each Rake finger, the delay is coupled to its antenna element, the despreader is coupled to an output of the delay and the complex weight gain device is coupled to an output of the despreader.

15. (currently amended): A wireless transmit/receive unit (WTRU) comprising:

a plurality of antenna elements for receiving a data signal;

for each antenna element, a plurality of Rake fingers, each Rake finger for processing a received multipath component of the received data signal of its antenna element by applying a complex weight gain to that received multipath component;

a complex weight gain generator for determining the complex weight gain for each Rake finger ~~for~~ of each antenna element using an input from all of the Rake fingers, wherein the complex weight gain generator performs a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix being derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger, producing a first matrix, and averaging a multiplication of the output of each despreader with its complex conjugate transpose over each Rake finger, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

a summer for combining an output of each Rake finger to produce an estimate of the data signal.

16. (currently amended): The WTRU of claim 15 wherein each Rake finger ~~having~~ includes a despreader ~~and the input from all the Rake fingers is an output from the despreader of all the Rake fingers.~~

Claims 17 and 18 (canceled)

19. (currently amended): The WTRU of ~~claim 17~~ claim 15 wherein the complex weight gain applied at each finger is an element of a resulting vector of the ~~produced~~ determined complex weight gains.

20. (currently amended): A wireless transmit/receive unit (WTRU) comprising:

a plurality of antenna element means for receiving a data signal;

for each antenna element means, a plurality of Rake finger means, each Rake finger means for processing a received multipath component of the received data signal of its antenna element means by applying a complex weight gain to that received multipath component;

a complex weight gain generating means for determining the complex weight gain for each Rake finger means ~~for~~ of each antenna element means using an input from all of the Rake finger means, wherein the complex weight gain generating means determines the complex weight gains by performing a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix is derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger means, producing a first matrix, and averaging a multiplication of the output of each despreading means with its complex conjugate transpose over each Rake finger

means, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

means for combining an output of each Rake finger means to produce an estimate of the data signal.

21. (currently amended): The WTRU of claim 20 wherein each Rake finger means ~~having~~ includes a means for despreading ~~and the input from all the Rake finger means is an output from the despreading means of all the Rake finger means.~~

Claims 22 and 23 (canceled)

24. (currently amended): The WTRU of ~~claim 22~~ claim 20 wherein the complex weight gain applied at each Rake finger means is an element of a resulting vector of the ~~produced~~ determined complex weight gains.

25. (currently amended): A base station comprising:  
a plurality of antenna elements for receiving a data signal;  
for each antenna element, a plurality of ~~rake~~ Rake fingers coupled to the antenna element, each finger having a delay, a despreader and a complex weight gain weighing device;

a complex weight gain generation device coupled to an output of each despreader and an input of each complex weight gain device, wherein the complex weight gain generation device performs a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix being derived by averaging a multiplication of the channel estimate with its

complex conjugate transpose over each Rake finger, producing a first matrix, and averaging a multiplication of the output of each despreader with its complex conjugate transpose over each Rake finger, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

a summer coupled to an output of each complex weight gain device, producing an estimate of the data signal.

26. (currently amended): The base station of claim 25 wherein for each Rake finger, the delay is coupled to its antenna element, the despreader is coupled to an output of the delay and the complex weight gain device is coupled to an output of the despreader.

27. (currently amended): A base station comprising:  
a plurality of antenna elements for receiving a data signal;  
for each antenna element, a plurality of Rake fingers, each Rake finger for processing a received multipath component of the received data signal of its antenna element by applying a complex weight gain to that received multipath component;

a complex weight gain generator for determining the complex weight gain for each Rake finger ~~for~~ of each antenna element using an input from all the Rake fingers, wherein the complex weight gain generator performs a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix being derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger, producing a first matrix, and averaging a multiplication of the output of each



despreader with its complex conjugate transpose over each Rake finger, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

a summer for combining an output of each Rake finger to produce an estimate of the data signal.

28. (currently amended): The base station of claim 27 wherein each Rake finger ~~having~~ includes a despreader ~~and the input from all the Rake fingers is an output from the despreader of all the Rake fingers.~~

Claims 29 and 30 (canceled)

31. (currently amended): The base station of ~~claim 29~~ claim 27 wherein the complex weight gain applied at each finger is an element of a resulting vector of the ~~produced~~ determined complex weight gains.

32. (currently amended): A base station comprising:  
a plurality of antenna element means for receiving a data signal;  
for each antenna element means, a plurality of Rake finger means, each Rake finger means for processing a received multipath component of the received data signal of its antenna element means by applying a complex weight gain to that received multipath component;

a complex weight gain generating means for determining the complex weight gain for each Rake finger means ~~for~~ of each antenna element means using an input from all the Rake finger means, wherein the complex weight gain generating means determines the complex weight gains by performing a complex conjugate transpose

of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix is derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger means, producing a first matrix, and averaging a multiplication of the output of each despreading means with its complex conjugate transpose over each Rake finger means, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

means for combining an output of each Rake finger means to produce an estimate of the data signal.

33. (currently amended): The base station of claim 32 wherein each Rake finger means ~~having~~ includes a means for despreading ~~and the input from all the Rake finger means is an output from the despreading means of all the Rake finger means.~~

Claims 34 and 35 (canceled)

36. (currently amended): The base station of ~~claim 34~~ claim 32 wherein the complex weight gain applied at each Rake finger means is an element of a resulting vector of the ~~produced~~ determined complex weight gains.

37. (currently amended): An integrated circuit (IC) for processing a data signal comprising:

an input configured to receive an output from a plurality of antenna elements;

for each antenna element input, a plurality of ~~rake~~ Rake fingers coupled to

the antenna element input, each finger having a delay, a despreader and a complex weight gain weighing device;

a complex weight gain generation device coupled to an output of each despreader and an input of each complex weight gain device, wherein the complex weight gain generation device performs a complex conjugate transpose of an inverse of a noise correlation matrix multiplied by a channel estimate, the noise correlation matrix being derived by averaging a multiplication of the channel estimate with its complex conjugate transpose over each Rake finger, producing a first matrix, and averaging a multiplication of the output of each despreader with its complex conjugate transpose over each Rake finger, producing a second matrix, and subtracting the first matrix from the second matrix, producing the noise correlation matrix; and

a summer coupled to an output of each complex weight gain device, producing an estimate of the data signal.

38. (currently amended): The IC of claim 37 wherein for each Rake finger, the delay is coupled to its antenna element, the despreader is coupled to an output of the delay and the complex weight gain device is coupled to an output of the despreader.